Dec. 10, 1968 L. M. YOCK 3,415,297

MACHINE FOR CHIPPING CORE LOGS AND VENEER

Filed June 20, 1966 3 Sheets-Sheet 1

FIG. 1

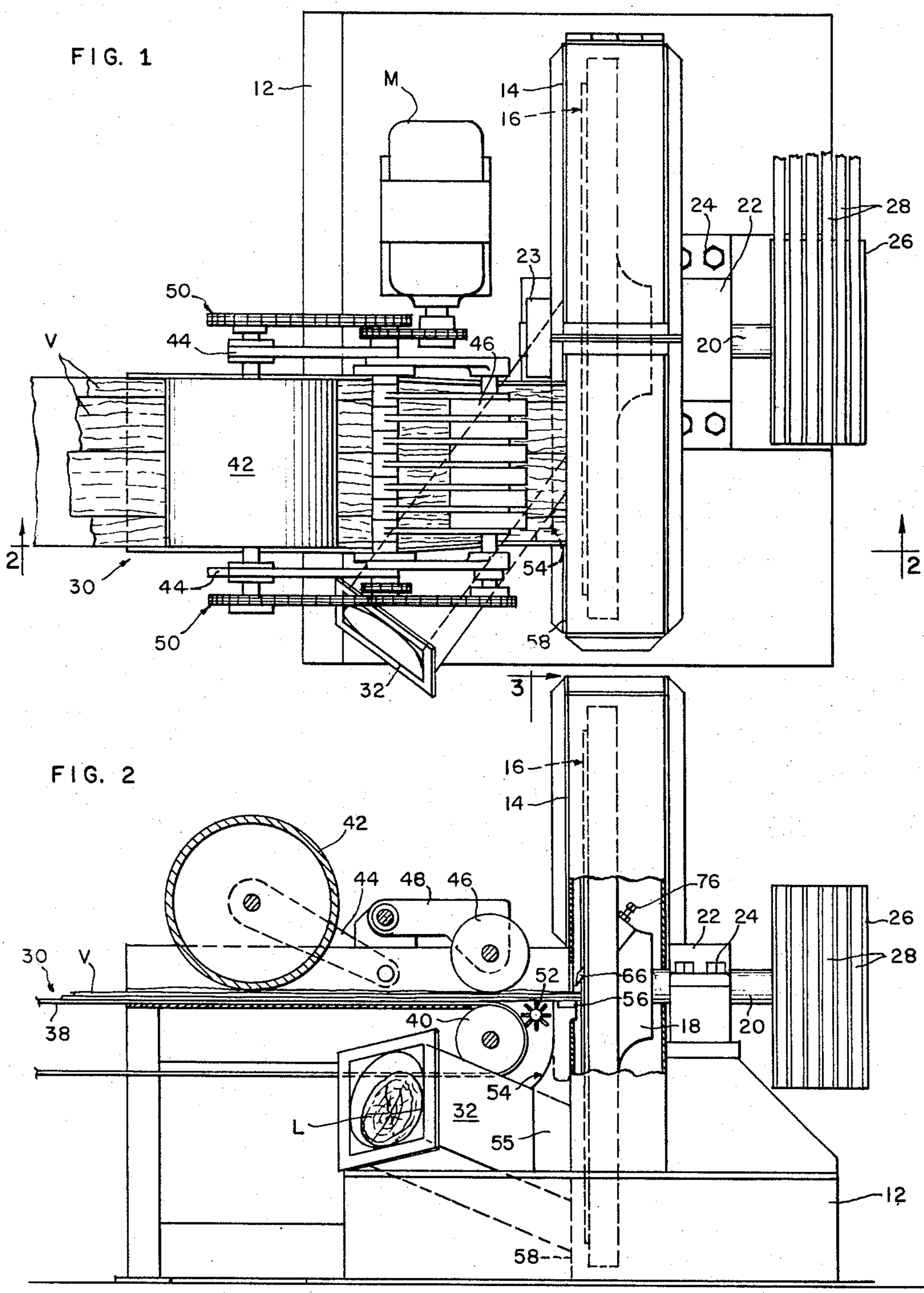


FIG. 2

LEWIS M. YOCK
INVENTOR

BY
BUCKHORN, BLORE, KLARQUIST & SPARKMAN
ATTORNEYS

Dec. 10, 1968 L. M. YOCK 3,415,297

MACHINE FOR CHIPPING CORE LOGS AND VENEER

Filed June 20, 1966 3 Sheets-Sheet 2

FIG. 3

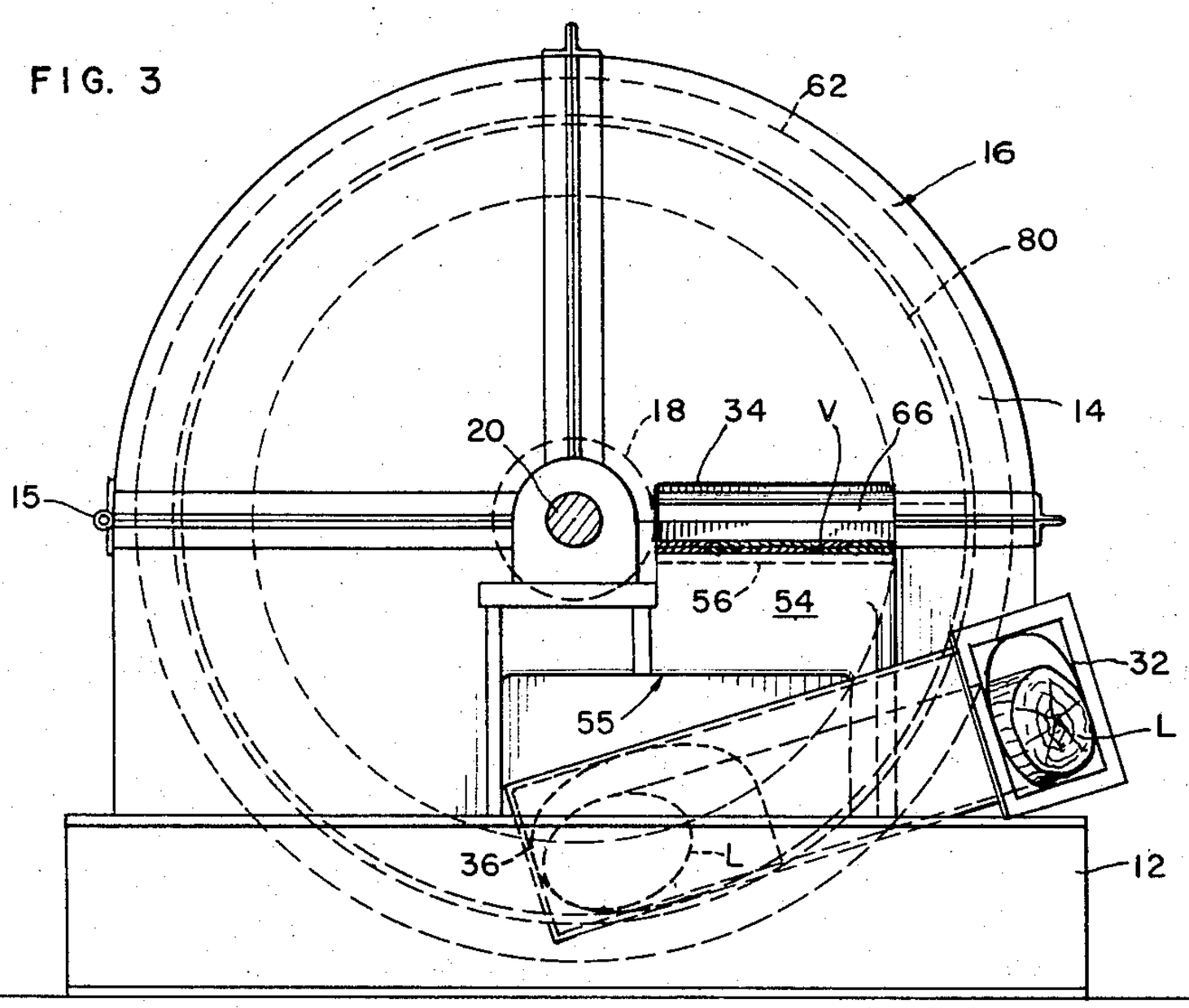


FIG. 5

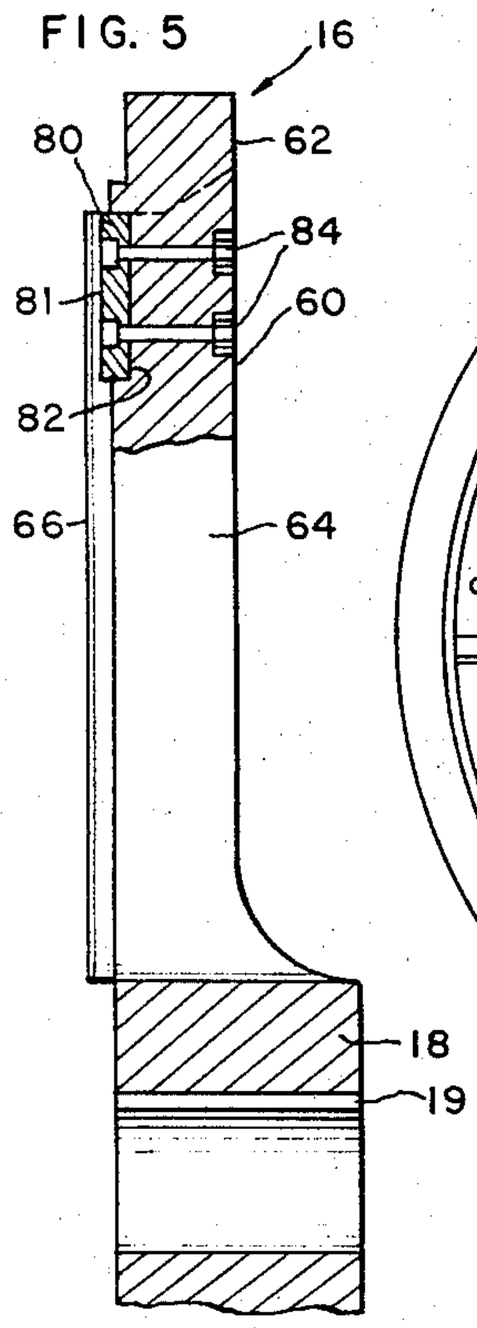


FIG. 4

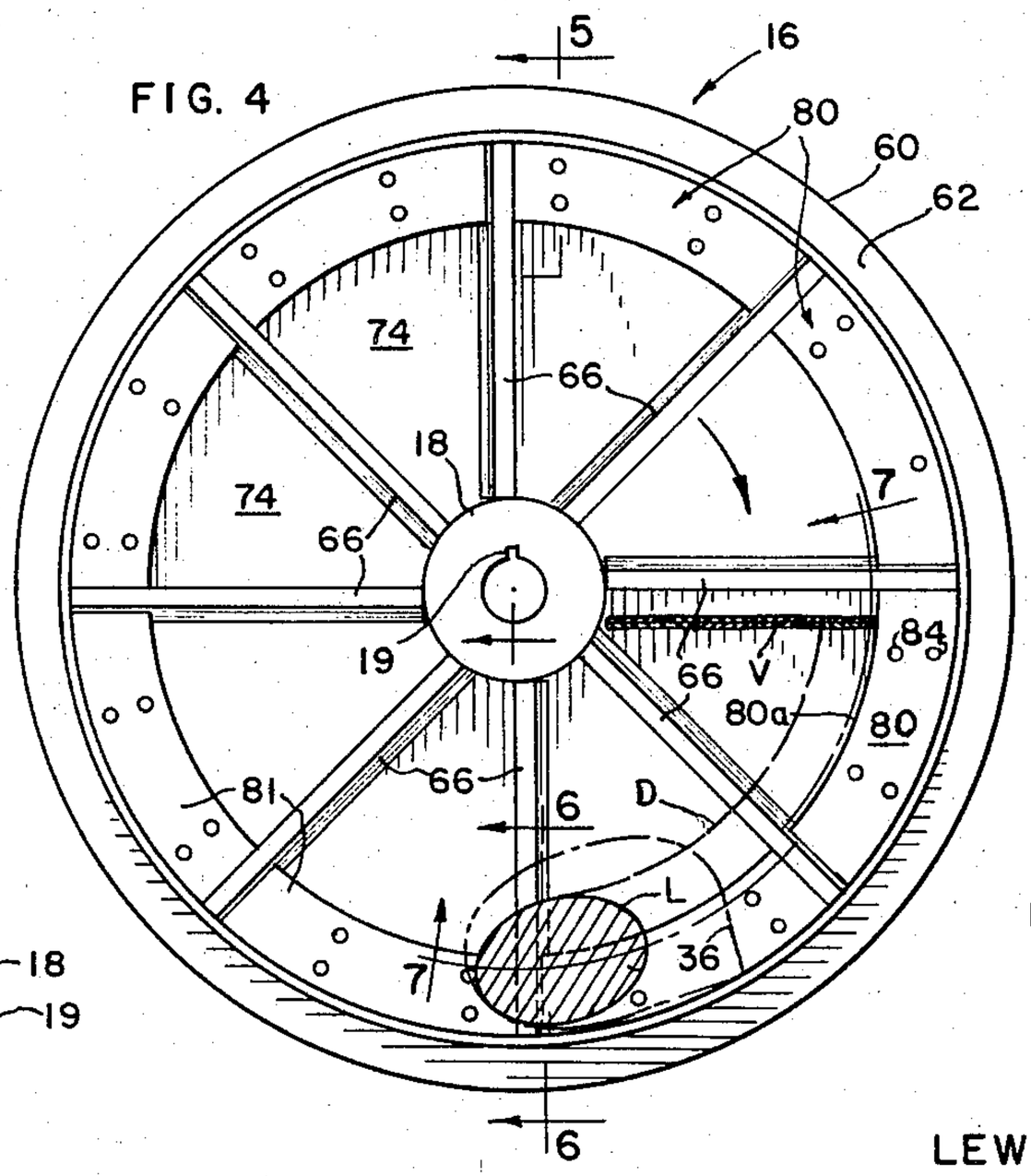
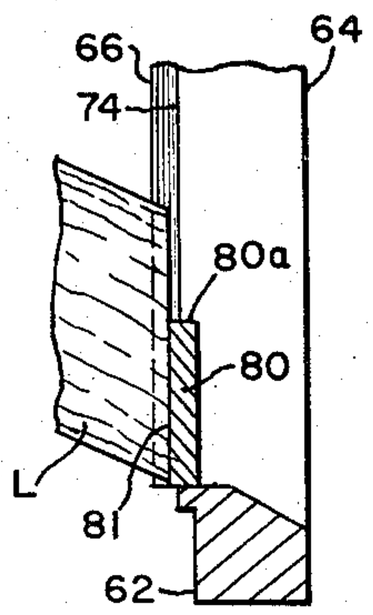


FIG. 6



LEWIS M. YOCK
INVENTOR

BY
BUCKHORN, BLORE, KLARQUIST & SPARKMAN
ATTORNEYS

Dec. 10, 1968 L. M. YOCK 3,415,297

MACHINE FOR CHIPPING CORE LOGS AND VENEER

Filed June 20, 1966 3 Sheets-Sheet 3

FIG. 7

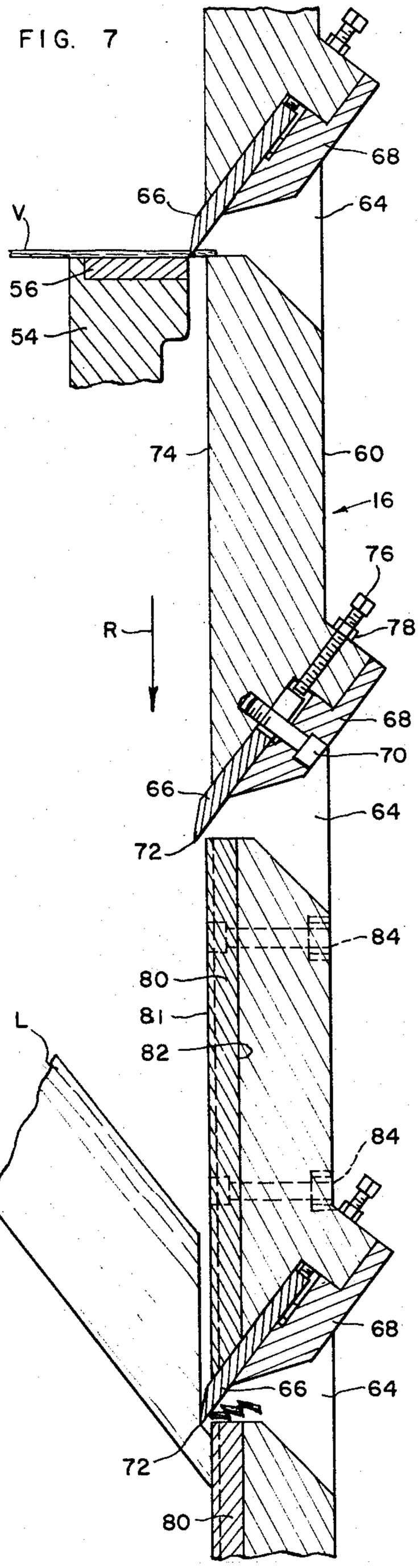


FIG. 8

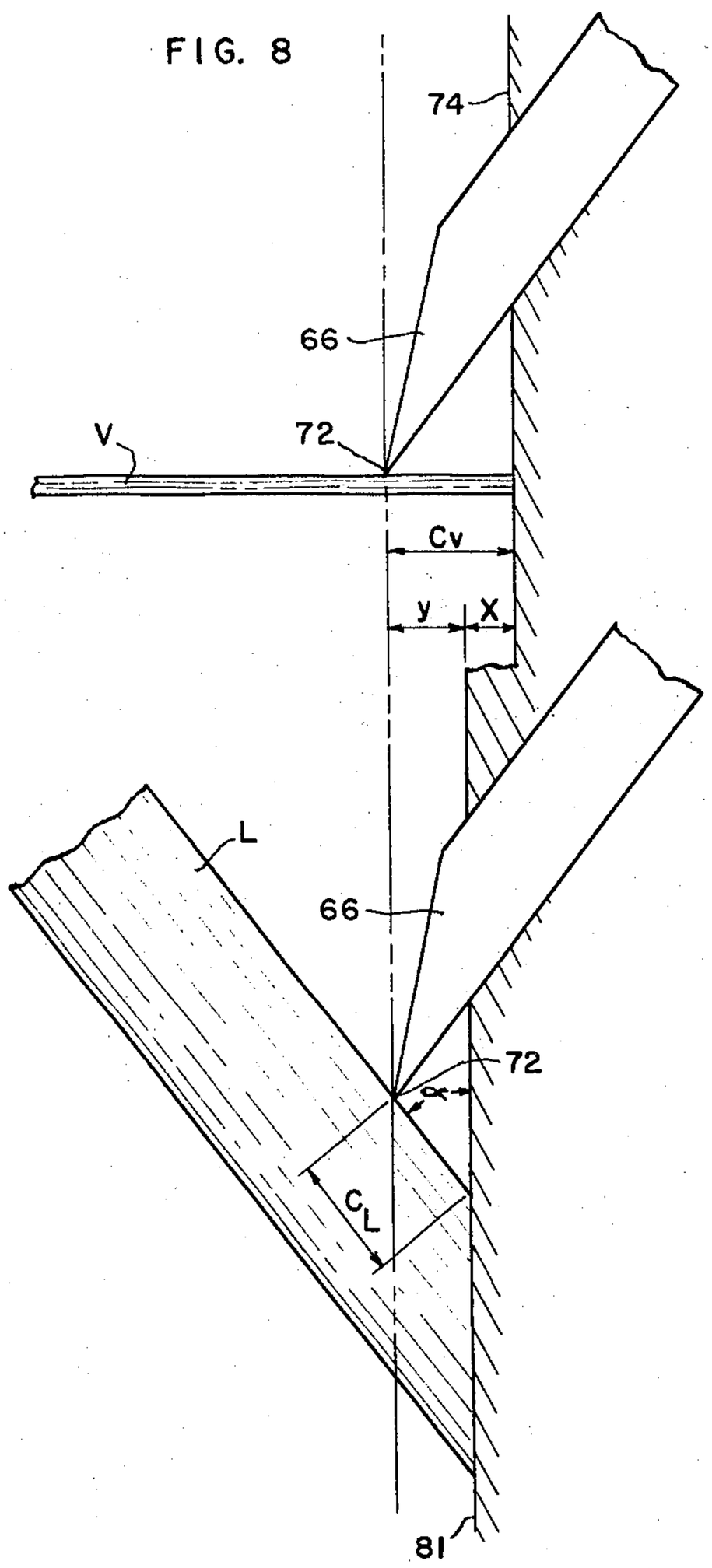


FIG. 9

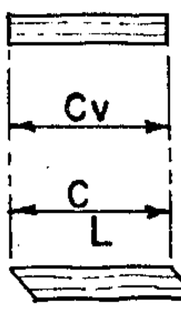


FIG. 10

LEWIS M. YOCK
INVENTOR

BY
BUCKHORN, BLORE, KLARQUIST & SPARKMAN
ATTORNEYS

United States Patent Office

3,415,297

Patented Dec. 10, 1968

3,415,297

MACHINE FOR CHIPPING CORE LOGS AND VENEER

Lewis M. Yock, P.O. Box 6366,
Portland, Oreg. 97206

Filed June 20, 1966, Ser. No. 558,898
9 Claims. (Cl. 144—176)

This invention relates to machinery for the production of wood chips for the pulp and paper industry and, more particularly, to a machine that is capable of making such chips from the waste products of a plywood mill, such as scrap veneer and the cores of logs from which veneer is stripped.

Pulp and paper makers prefer to utilize chips that will provide fibers of substantially uniform length. To provide such chips heretofore, however, the machines that have made them from core logs and scrap veneer have been divided into two types: those that have chipped only veneer and those that have chipped only core logs. The two types of machines are similar in that each uses a disc cutter having radially-extending knives attached to the cutting surface of the disk, against which surface the material is fed. Those machines that cut chips from veneer have the infeed placed at right angles to the disk cutter; and those that cut chips from core logs have the infeed placed at an oblique angle with respect to the surface of the cutter, so that the knives can make their cuts at least partially with the grain.

No single machine has heretofore been provided that is capable of making wood chips that will provide fibers of uniform length from both core logs and veneer.

Accordingly, it is an object of the present invention to provide an improved machine that is capable of making chips from both core logs and scrap plywood veneer.

More particularly, it is an object of the present invention to provide such a machine that can make chips that will provide fibers of uniform length from either core logs or veneer.

In accordance with an illustrated embodiment, the chipper of the present invention comprises a disk cutter having a generally planar surface, but including an annular stop portion which projects from such surface toward the cutting edges of a plurality of radially extending knives mounted thereon. Means are provided to deliver the core logs at an angle to the cutting surface of the cutter so that at least a portion of a log impinges on the stop portion thereof. Means are also provided to deliver the veneer at right angles to and against the non-projecting portion of the cutting surface of the cutter. Thus the veneer is subjected to the full "bite" of the knives so as to cut chips of predetermined length. The annular stop portion functions to reduce the "bite" of the knives into a core log and is so arranged that by reason of the angular feed of the core logs, chips cut from both the logs and the veneer have fibers of substantially the same length.

Other objects and advantages of the present invention will become apparent in the details of construction and operation described in the following specification, reference being had to the accompanying drawings in which:

FIG. 1 is a top plan view of a veneer and core log chipping machine made in accordance with my invention;

FIG. 2 is a sectional view taken on line **2—2** of FIG. 1;

FIG. 3 is a sectional view taken on line **3—3** of FIG. 2;

FIG. 4 is a front elevational view of the disk cutter of the machine of the present invention;

FIG. 5 is an enlarged sectional view taken on line **5—5** of FIG. 4;

FIG. 6 is an enlarged sectional view taken on line **6—6** of FIG. 4;

FIG. 7 is a greatly enlarged developed view taken on line **7—7** of FIG. 4;

FIG. 8 is a schematic view similar to FIG. 7;

FIG. 9 is a typical veneer chip made by the machine of the present invention; and

FIG. 10 is a typical chip made from a core log by the machine of the present invention.

Referring to the drawings and particularly to FIGS. 1 and 2 thereof, the machine of the present invention has a base **12** which is adapted to be secured to a foundation of concrete or the like. A cutter housing **14** is superimposed upon and secured to the base **12**. The housing **14** is hinged as at **15** to provide access to the interior thereof. (See FIG. 3.) A disk cutter **16** is rotatably mounted within the housing **14** and is secured at its hub **18** by a key **19** to a driven shaft **20** journaled in bearings **22** and **23** which are secured to the base **12** as by bolts **24**. The shaft **20** is driven by means of belts **28** and a pulley **26** by a source of power, not shown.

An infeed veneer chute indicated generally by the numeral **30** and a log chute **32** are in open communication with the interior of the housing **14** by means of openings **34** and **36**, respectively, whose location relative to the disk cutter **16** is best shown in FIGS. 3 and 4. The opening **34** for the veneer chute **30** is located adjacent to and slightly below the center of the disk cutter **16**. Means are provided to feed sheets of veneer V to the interior of the housing **14** through the opening **34** so that they may be cut into chips, such means comprising a conveyor belt **38** having an upper horizontal flight extending perpendicularly to the disk cutter **16** and supporting the veneer sheets V to be chipped. The belt **38** travels around a driven drum **40**. Mounted over the conveyor belt **38** is a main feeding drum **42** which is supported on pivotable arms **44** so as to pressurably engage veneer on the conveyor belt **38** and assist in maintaining the movement of the veneer toward the cutter **16**. A plurality of weighted rollers **46** pivotably mounted on arms **48** apply additional pressure to the sheets V. The conveyor belt **38** and drums **40** and **42** are powered by a motor M through a series of conventional chain drives indicated generally by the numeral **50**.

The sheets of veneer V are fed by the means described onto an anvil **54**, which is best shown in FIGS. 2 and 3, and against the face of the disk cutter **16**. The anvil **54** comprises a rigid base frame **55** and is preferably provided with a replaceable steel insert **56** having a plane upper surface coplanar with the top flight of the conveyor belt **38**, thereby to maintain the veneer sheets horizontal as they are brought perpendicularly to the disk cutter **16**. A grizzly roller **52** is provided between the end of the conveyor **38** and the anvil **54** to pick up small bits and pieces of veneer which might otherwise go astray.

The log chute **32** is fabricated of steel and is secured to the base **12** and, if desired, to the front wall **58** of the housing **14** in any suitable manner. The chute **32** is adapted to convey core logs L at an oblique α (see FIG. 8) to the surface of the disk cutter **16**, so that the knives attached thereto can make their chipping cuts at least partially with the grain.

The disk cutter **16**, as best illustrated in FIGS. 4, 5 and 7, comprises a disk **60** provided with a peripheral rim or tire **62** and radially disposed chip slots **64** extending from the hub **18** to the rim. A plurality of radially extending knives **66** are adjustably attached to the disk **60** by knife-clamping plates **68**, which plates are attached to the disk by bolts **70** (see FIG. 7). The cutting edges **72** of the knives **66** lie in a common plane and are offset from the planar cutting surface **74** of the disk **60** by an amount which can be controlled by jack screws **76** and locknuts **78**. Thus the sheets of veneer V which are fed against the surface **74** are clipped off by the edges **72** to form chips of predetermined length.

The logs L are fed against the disk **60** at an oblique angle, as above mentioned. Thus, if the logs L were to im-

pinge on the same cutting surface **74** as the veneer sheets V, the length of the chips cut from the logs would necessarily be longer than those cut from the veneer. Since the length of the chips must be the same whether they are cut from veneer or from logs, the planar cutting surface of the disk **60** on which the logs L impinge is positioned parallel to and between the cutting surface **74** and the common plane in which lie the cutting edges **72** of the knives **66**. This is accomplished by means of an annular stop, which comprises a plurality of annular segmental plates **80** attached to the outer peripheral portion of the disk **60** in between adjacent cutting knives, so that a planar surface **81** of the plates **80** projects from the main cutting surface **74** of the disk. The plates **80** are received into an annular slot **82** and are attached to the disk **60** by recessed head bolts **84**. Thus the logs L which are fed against the surface **81** are clipped off by the edges **72** of the knives **66**, as shown in FIG. 7, the knives moving in the direction of the arrow R.

As shown schematically in FIG. 8, the surface **81** of the segmental plates **80** projects from the surface **74** of the disk **60** by an amount x. The angle made by the core logs L with respect to the surface **81** is denoted by the letter α. The veneer sheets V are delivered perpendicularly to the surface **74**, and the length of chip cut therefrom is denoted by c_V. The length of chip cut from the logs is denoted by c_L. Since,

$$y=c_L \sin \alpha$$

and

$$x+y=c_V$$

if we wish to make

$$c_V=c_L=c$$

then

$$x=c(1-\sin \alpha)$$

Thus, no matter what the angle α is at which the logs L are fed against the disk cutter **16**, if the surface **81** of the segmental plates **80** projects from the surface **74** of the disk **60** by an amount $c(1-\sin \alpha)$, the length of chip c_V cut from the sheets of veneer V will be identically equal to the length of chip c_L cut from the logs L. Since the fibers run parallel to the sides of the chips, the fiber length of the chips will be substantially equal. This will be apparent from FIGS. 9 and 10.

The angle α is typically chosen to be 38°. A desirable length of chip is $1\frac{1}{16}$ inch. Under these conditions

$$y=(1\tfrac{1}{16})(\sin 38°)=.424 \text{ inch}$$

$$x=(1\tfrac{1}{16})(1-\sin 38°)=.264 \text{ inch}$$

which latter distance is the amount that the surface **81** should project from the surface **74**.

It will be noted from FIG. 6 that the radial dimension (which is the width) of the segmental plates **80** is considerably less than (being preferably about one-half) the diameter of the maximum size log L that will fit within the chute **32**. As long as a substantial portion of the log is stopped by the surface **81**, the length of chip c_L cut therefrom will be equal to the length of the chip c_V cut from the sheets of veneer.

Referring to FIGS. 3 and 4, it will be seen that the opening **34** for the veneer chute **30** extends radially across the face of the disk cutter **16** to the inner edge **80***a* of the plates **80**. The opening **36** for the log chute **32** extends inwardly of the inner edge **80***a* of the plates **80**. Thus, there is a substantial area of overlap on the disk cutter **16** in which both veneer sheets V and core logs L can be chipped, and this is indicated by the dashed line D in FIG. 4. The over-all diameter of the disk cutter **16** is thus considerably reduced, thereby to keep its peripheral speed and power requirements within desirable ranges.

In the foregoing description, the invention has been described with reference to a certain preferred particular embodiment, although it is to be understood that the specific details shown are merely illustrative and that the invention may be carried out in other ways without departing from the true spirit and scope of the following appended claims.

I claim:

1. A machine for chipping veneer and core logs comprising:

a disk cutter mounted for rotation about its axis;

said cutter including a first planar face portion normal to said axis;

said cutter including a plurality of radially entending knives having cutting edges extending perpendicularly to said axis and lying in a common plane,

said common plane being spaced a predetermined distance outwardly from said first planar face portion;

said cutter including a second planar face portion parallel to and positioned between said first planar face portion and said common plane;

means to feed veneer against said first planar face portion and perpendicularly thereto; and

means to feed core logs against said second planar face portion at an oblique angle thereto.

2. A machine as described in claim **1**, in which said second planar face portion projects from said first planar face portion by an amount

$$x=c(1-\sin \alpha)$$

where:

c is the length of chip desired, and

α is the angle at which said logs are fed against said second planar face portion.

3. A machine as described in claim **1**, in which said core log feeding means comprises a chute mounted at said oblique angle to said second planar face portion.

4. A machine as described in claim **1**, in which said veneer feeding means comprises a chute mounted perpendicularly to said first planar face portion.

5. A machine as described in claim **4**, in which the opening for said veneer chute is located adjacent to the slightly below said axis of said disk cutter.

6. A machine as described in claim **1**, in which said second planar face portion comprises an annular stop attached to said disk cutter.

7. A machine as described in claim **6**, in which said annular stop is disposed on the outer peripheral portion of said disk cutter.

8. A machine as described in claim **6**, in which said annular stop has a radial dimension less than the diameter of the maximum size log to be chipped.

9. A machine as described in claim **6**, in which said annular stop comprises a plurality of annular segmental plates attached to said disk cutter, each of said segmental plates being attached to said cutter in between adjacent cutting knives.

References Cited

UNITED STATES PATENTS

2,570,845	10/1951	Ottersland	144—176
2,712,904	7/1955	Durkee	144—176 X
3,297,067	1/1967	Zaichkowsky	144—176
3,335,771	8/1967	Ledergerber	144—162 X

ANDREW R. JUHASZ, *Primary Examiner.*

FRANK T. YOST, *Assistant Examiner.*

U.S. Cl. X.R.

144—3